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# West Europe Report

SCIENCE AND TECHNOLOGY

No. 131

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## WEST EUROPE REPORT SCIENCE AND TECHNOLOGY

No. 131

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## ELECTRONICS

### FOREIGN COMPANIES' ROLE IN ELECTRONICS INDUSTRY DISCUSSED

Paris ELECTRONIQUE ACTUALITIES in French 1 Oct 82 pp 1, 8

[Article by P. Schaeffer: "Mauroy at SICOB [Commercial and Office Equipment Industry Exhibit"] Electronics Industry Open to Foreign Firms"]

[Text] In officially opening the SICOB last 22 September, Mauroy emphasized the role of foreign firms established in France, rejoicing at "noting that many of them have industrial establishments in our country, alone or in partnership with French firms."

Thus the prime minister brought additional precision to the strategy being applied so that the electronics industry will reach its objectives.

The program of the industry, spread out 5 years, makes provision for a contribution of 140 billion francs to the firms in this sector, a contribution which will not be made by the administration alone, but will in a large part come from private firms, both French and foreign. With respect to the data processing sector alone, Mr Cassini, president of IBM-Europe, has just declared that "IBM's future investments in France are included in the financing plan for the electronics industry." For its part, Hewlett-Packard-France, through its president, Mr Beauvillain, has undertaken a public relations campaign showing how this firm is sharing the industrial preoccupations of the government.

Compared to the attitude of the French authorities these past years, the evolution is considerable. Foreign firms are now encouraged to integrate themselves into the collective effort, even in the electronics industry, on the same footing as French private firms, and even when it is the nationalized firms which are called upon to bear the major part of this collective effort.

Mauroy declared: "France has always been and will remain happy to welcome foreign industries in its territory. When they arrive in our country, they know that they can take advantage of the considerable effort which government has made in favor of businesses. And, more specifically, in favor of those connected with the electronics industry. Your sector is, in fact, one of those which the government has chosen to base its policy of industrial renewal and, through it, to gradually reestablish the fundamental balance of our economy and particularly our balance of payments."

The industry's objectives are, in due time, to reestablish equilibrium in the balance of trade, stimulating industrial investments that create jobs. That the participation of foreign firms is so clearly solicited in order to attain these objectives is not only significant of a certain realism, but also revealing of a will to end certain ostracisms.

As for IBM, Mr Chevenement met last week with Mr Opel, president of the American firm, and their discussions obviously touched on these questions. And they took place in a favorable climate, Cassini having emphasized that "the electronics industry in France shows how a country can program the industries of the future rather than creating obstacles for them."

The precision brought by Mauroy to the SICOB is in line with this logic, and all the more so because the prime miister was careful to emphasize that "we have never been, we will never be, partisans of autarky, either commercial or technological."

9969

CSO: 3698/30

## ELECTRONICS

### PROSPECT OF OLIVETTI COOPERATION WITH FRENCH COMPANIES FADES

Paris L'USINE NOUVELLE in French 28 Oct 82 p 65

[Article by Olivier Fleurot: "Olivetti: The U.S. Attraction"]

[Text] The capital increase now in progress in the Olivetti group will take place without any contribution from French shareholders. The French-Italian association in the field of office automation is thus highly compromised as a result of French hesitations. As Olivetti is acquiring interests in U.S. companies, it is increasingly turning away from cooperation with French companies.

Olivetti sales in 1981 amounted to 14.4 billion francs (66 percent of which for export sales) and its personnel numbered 53,000. It is increasingly asserting itself as the European leader in small computing and office automation. The French (essentially the Bull Machines Company) could have every reason to rejoice since they held 34.2 percent of Olivetti's shares before the latest capital increase, reserved to the Italian financial market and involving 175 million francs, and since they have one third of the votes in the control syndicate.

Actually, it would be possible to contemplate the creation of a French-Italian office automation pole having the critical weight required tomorrow to resist the pincer movement of the U.S. and Japanese competition. All the more so as Olivetti now has a 65 percent interest in the new Logabax company, the financial position of which seems to show a marked improvement (its sales are expected to total 450 million francs in 1982), and as Carlo de Benedetti, vice-chairman and managing director, does not conceal his intentions: "Europe is in a position of inferiority with respect to Japan and the United States. It will have to consider integration or any other form of cooperation between European industries," he said at the World Data Processing Congress in Copenhagen.

Now, cooperation between Olivetti and French enterprises is at a standstill. Two examples among many show it. The French are importing North-American word-processing equipment although Olivetti is offering a very complete line of systems. In facsimile transmission, the French companies Thomson-CSF [General Radio Company] and Alcatel-Electronique are trying to make a name

for themselves, next to the Japanese, with a promising line. On 19 July, Otelco, the telecommunication subsidiary of Olivetti, signed an agreement with the Japanese Sharp, under which Olivetti's sales network in Europe will distribute Sharp telecopiers.

True, in France we still do not know who is going to do what in office automation. In distributed data-processing, the project for an association between DAP [expansion unknown] (Corail line), Sems (taken over by CII [expansion unknown]-Honeywell-Bull), Transac-Alcatel, and the relevant portion of CII-Honeywell-Bull (the TTX 35 terminals and possibly the Questar line) is still not finalized and is slowed down by the usual French-French haggling.

While they are bickering in Paris, Olivetti is multiplying its participations in foreign companies, especially in the United States, where the group is investing in companies with research and production facilities. Joint venture with Irwin in the field of memory media and printers, research center in Cupertino in the California Silicon Valley, and especially merger of Olivetti United States with the American company Docutel. The new Docutel-Olivetti company, in which the Italian group has a 48 percent interest, is expected to achieve a sales figure of 2 billion francs in 1982. Olivetti has now acquired an interest in over 10 U.S. companies.

The hope of creating a French-Italian office automation pole are progressively fading. Unless the present conversations between Jean-Pierre Chevenement and Carlo de Benedetti have a successful outcome. Through SNL [expansion unknown], it is true, Olivetti has just obtained a contract to study the Temco project multishop cashier's terminal, which could be marketed in 1984. The Europe of data processing has failed. The Europe of office automation is about to miss the boat.

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CSO: 3698/59



## ELECTRONICS

### WORK IN ADVANCED ROBOTICS SOFTWARE, ARTIFICIAL INTELLIGENCE

Paris L'USINE NOUVELLE in French 28 Oct 82 p 67

[Article by Michel Defaux: "ITMI: Advanced Software for Robotics"]

[Text] Transfer of knowhow from the laboratories to the industry, study of prototypes, realization of advanced software products, etc.: ITMI, just created in Grenoble, will fill a considerable vacuum in French robotics.

"Robotics is not restricted to the construction of equipment. It includes quite considerable engineering and software activities. It is essential that these capabilities be available in France." A few months after saying these words, Jean-Pierre Chevenement, minister of research and industry, has been heard. Indeed, a group of research scientists from the "artificial intelligence and robotics" group of the IMAG/INPG laboratory (Grenoble Data Processing and Applied Mathematics and Grenoble National Polytechnical Institute) have just created ITMI (Intelligent Machine Industry and Technology): "This is the first French company for the creation and distribution of advanced software for robotics and artificial intelligence," Gerard Mezin, chairman of the board, explained.

According to Christian Potie, member of the board and financial director: "In the past two years some ten such American companies have experienced a rapid growth. For instance, Machine Intelligence Corporation and Automatix. These companies will be tomorrow's large industrial companies. We want to be one of them. This is our challenge."

ITMI is supported by the IMAG research team. "It was created five years ago," Jean-Claude Latombe, who heads it, added. "For many years we have maintained relations with manufacturers who can control software evolution. I have encouraged and taken part in the creation of this company." Financially, ITMI has a capital of 650,000 francs. Its investment budget has been set at 3.5 million.

Already, ITMI has three types of realizations to offer to manufacturers. These are a programming language, LM (Handling Language), which describes handling tasks in terms of movements, based on data transmitted by sensors (seeing, feeling or measuring forces). Suitable for assembly, arc-welding, loading and

unloading machines, it was selected for the ARA [Advanced Automation and Robotics] research program and, for the moment, is sold by Scemi, a French manufacturer of assembly robots. ITMI, however, does not rule out the possibility of agreements with foreign manufacturers. The second product, called V3D, includes a sensor for three-dimensional vision and a basic software. Its applications: welded joint control, localization of objects. The third product, now being developed, is a comprehensive vision system working on images of varying light intensities, which will indicate the outline of objects by calculating light contrast (sorting tasks, feeding work stations).

At present, the company has 12 shareholders and employs 4 people. Considering its workload, it plans to hire another 12 people next June, and to increase its personnel to 30 in the next 3 years.

As far as products are concerned (software for simpler manipulators), ITMI could get interested in the peripheral part of the robot (wrist and end piece) and, in 1984, end up supplying completed turnkey products consisting of robots, programming languages and vision systems.

9294

CSO: 3698/59

## ELECTRONICS

### ARTIFICIAL INTELLIGENCE COMPANY FORMED

Paris ELECTRONIQUE ACTUALITES in French 29 Oct 82 p 5

[Article by GB]

[Text] The first French company devoted solely to artificial intelligence has just seen the light of day: ITMI (Industry and Technology of Intelligent Machines) has been created at Meylan, in the Grenoble suburbs, by a core of researchers coming from the IMAG and INPG laboratories.

The creation of ITMI is a sufficiently rare industry-research transfer in France to deserve mention, at a time when small companies specializing in artificial intelligence are booming on the American West Coast; its objective is "a very wide dissemination in companies of all sizes, of computerized robots endowed with perception capabilities."

ITMI's first area of activity will be robot programming: the company will distribute, maintain, and develop the LM language perfected at IMAG in collaboration with several industrial users. This language, which for several years has interested many robot manufacturers, had thus far received only restricted dissemination for lack of an industrial structure that could sustain it. This gap has thus been filled, and several manufacturers are now ready to use LM. The Swedish company ASEA is soon expected to sign a licensing agreement with ITMI to offer this language with its robots. ITMI will also develop graphic simulation means and interfaces with CAD systems. Robotized assembly stations using these resources will also be distributed.

The second area of involvement at which ITMI is aiming, is visualization and shape recognition. Here again, the company will depend on IMAG's developments, hence the distribution of the three-dimensional visualization system, V3D, selected as part of the ARA advanced robotics project. V3D is a software detector, using a video camera and a laser; the latter emits a light plane that intersects the objects in a scene, and which obtains their three-dimensional coordinates through a triangulation process. Its areas of application are volume inspection, followed by welding and object location. ITMI will also offer the image treatment system on a microcomputer card, NIM 625, developed by Adersa-Gerbios (see ELECTRONIQUE ACTUALITES of 5 March 1982), after having reinforced it with shape recognition programs.

Unlike most systems currently on the market, which analyze contours through thresholds based on purely binary transitions (0=white, 1=black), the PVV will include a cabled fast processor and will operate by contrast extraction at several levels of light intensity (from 16 to 256). Its areas of application are object sorting and the feeding of work stations.

Beyond these products, ITMI proposes to offer more general services: training, consultation, prototype fabrication. The company plans to put on the market beginning in 1984, integrated products consisting of robots, plus programming language, plus visualization systems.

Starting with only a few people at the moment (its private funds are 650,000 francs), ITMI expects to have some thirty employees in three years. It will maintain close ties to IMAG, with some ten researchers from the latter laboratory being authorized to act as consultants. The company's turnover should reach 5 million francs in its first fiscal year, with orders amounting to 1.5 million being on the books at the time of its formation. ITMI's budget stipulates investments of the order of 3.5 million francs for the next three years.

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CSO: 3698/79

## ELECTRONICS

### THOMSON, MATRA TO COOPERATE IN MICROLITHOGRAPHY FIELD

Paris ELECTRONIQUE ACTUALITES in French 29 Oct 82 pp 1, 18

[Article by FG]

[Text] The government has reconsidered the decision taken by Thomson (see ELECTRONIQUE ACTUALITES of 22 October): Thomson will after all, carry out its microlithography activity.

On Wednesday 27 October, Jean Pierre Chevenement, minister of research and industry, asked the various enterprises and laboratories concerned with microlithography in France, notably Thomson and Matra, to offer within one month a proposal for technical, financial, and commercial cooperation, that would make it possible to organize the efforts being made in this field. "This action, which will take the form of a national project, is a necessary condition for the full development of the components sector, an essential element of the electronic industry," pointed out the minister of research and industry.

Up to Wednesday, Thomson-CSF had still not officially announced its intention to terminate its activities in the manufacture of microlithography machines. However, on Friday 22 October, Mr Darmon, deputy director of the communications branch, had officially told the press that he confirmed his decision, and that the latter would not be announced officially.

In an information memo addressed to its personnel, Thomson-CSF indicated that the main cause for this termination "results from the agreement reached by Matra and GCA. This association significantly reduces the accessible European market, and thus no longer makes it possible to rely on this springboard to achieve strength on the world market." Consequently, "very heavy investments are no longer justified," pointed out Thomson, which had planned to relocate the employees of SML (microlithography department) in other subsidiaries.

In turn, the SML personnel and CFDT (French Democratic Work Confederation) held a press conference on 22 October, at which they stated their belief that if nothing is done, the French electronic components sector "will become totally dependent on American companies." They asked for a three-party meeting (Ministry of Industry, Thomson, and personnel plus unions) which should be held on 3 November.

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CSO: 3698/79

## ELECTRONICS

### THIN-FILM LAB AT CIT-ALCATEL EXPANDS TO OUTSIDE SALES

Paris CHIMIE MAGAZINE in French Sep 82 p 7

[Unsigned article]

[Text] The Vacuum and Mechanics Division of CIT-Alcatel has just decided to expand the capabilities of its thin-film deposition shop.

Located in the Annecy plant, which manufactures vacuum equipment and thin-film systems, this shop had the main task of satisfying internal needs: process development, mass production of circuits, and so on.

In order to meet the demands of its customers, CIT-Alcatel thus decided to expand the scope of this shop's activities, which will now include all thin-film deposition operations on customer specifications.

This shop is of interest to those who do not have the research equipment necessary to test processes, and/or those who do not want to undertake a given deposition on their own.

The shop's major equipment consists of: two standard deposition stations which can accept--depending on requirements--various deposition modules and various sample carriers; two production machines, one of which is a high-rate in-line model; as well as ancillary installations, such as cleaning equipment (ultrasonic or spraying), and control instruments to measure the thickness, resistance per square, and temperature coefficient of deposited films.

Deposition process capabilities range from conventional thermal evaporation, to magnetron cathode sputtering, including DC or RF diode sputtering.

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## ELECTRONICS

### THOMSON TO INCREASE PRODUCTION OF HYBRID CIRCUITS

Paris L'USINE NOUVELLE in French 11 Nov 82 p 49

[Article by Jean-Luc Austin]

[Text] An increase of 20 percent per year in current francs until 1987. This is the ambitious goal of Thomson's hybrid circuits department. Large investments will be made at the Puiseaux plant to support this ambition.

Microelectronics is microprocessors; it is also hybrid technology. Sometimes underestimated by electronics specialists themselves, this technology consists of interconnecting electronic components with conducting areas deposited on special substrates. Their major advantage is the miniaturization of electronic functions. Unfortunately, hybrid technology is also an expensive one, and most of its applications fall in the area of professional electronics.

However, the future does not appear bleak for Thomson-DCH (department specializing in hybrid circuits at Thomson): turnover will reach 150 million francs in 1982 (+15 percent with respect to 1981), and what is more, DCH hopes to achieve an annual 20 percent growth in current francs until 1987. These ambitious goals are manifested today by the relocation of the studies section (60 people) from Orsay to the Puiseaux (Loiret) plant, and by the expansion of this same plant, representing investments of 15 million francs in 1982, and about 10 million in 1983.

There are two main reasons for DCH's decision to install new means of production. First, to reduce its relative share in the turnover of the Thomson group; this share is reaching more than 85 percent in 1982, and the objective is to reduce it to 55 percent in 1987. And secondly, in order to draw new customers, DCH must be able to respond to the production surges experienced by the non-captive market of hybrid technology. In addition, it wants to gradually reconvert to other segments of the market. Today, nearly 60 percent of DCH's products are used in the telephone industry, and 30 percent in military and aeronautics equipment. It is this second sector that is currently the preferred target of DCH's sales force. The increasingly massive use of integrated circuits in telephone installations creates an equal reduction in the position of hybrid technology.



Despite the ambitions of the Thomson group in this area, mass market applications remain at the potential stage, essentially because of pricing. "We don't know how the Japanese manufacturers can supply hybrid modules at 20 francs, and even though our technical capabilities are equally as good, we have no way of staying at this price level," explains Alain Berest, director of DCH.

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## ELECTRONICS

### SIEMENS HAS FOUR PERCENT OF WORLD COMPONENTS MARKET

Paris ELECTRONIQUE ACTUALITES in French 5 Nov 82 p 23

[Article by JPDM]

[Text] Munich--During the 1981/1982 fiscal year, Siemens will have achieved a turnover of 2.2 billion DM (6.22 billion francs) in the area of electronic components. The company thus covers about 4 percent of the world market for electronic components. It hopes to exceed 3 billion DM (8.5 billion francs) by 1985/1986, at which time it estimates that the world market for electronic components will reach 83 billion DM (235 billion francs).

The company remains optimistic about the future, although it recognizes that "all the economic indicators urge us toward pessimism." It also acknowledges that the manufacturing of several types of products had to be abandoned in recent years, and that problems still exist in passive and discrete devices: "we cannot make everything," it states. It points out however that the termination of these types of products affected only 5 percent of its catalog. The components to which Siemens is currently assigning priority are integrated circuits, power MOS circuits, opto-electronic components, lasers, and GaAs products in general. Added to these are power condensers in the passive area, and transmission tubes. (Receivers are no longer mentioned, but are still being developed).

Siemens' components group is suffering in particular from the current poor situation in the world, since it achieves 47 percent of its turnover from exports (compared to 40 percent in 1975). It should be stated however, that the German market is doing no better, if not worse, than the world market as a whole; 70 percent of its sales in fact occur outside the group. In this context, development priorities are assigned only to innovative products. At Siemens, 80 percent of the components are in principle obsolete after five years. In the tube field, the 1980/1981 turnover will have reached 700 MF (million francs), of which 368 MF for special tubes and 110 MF for transmission tubes. The exported portion in this case is 64 percent for the former, and 70 percent for the latter. Turnover growth was zero in 1982; it should be 1 percent in 1983 (the inflation rate has been 5.5 percent/year for

Development of integrated circuits activity at Siemens during  
the 1980-1982 recession

	79/80	81/82
German market		
DM	1,400 M	1,350 M
Index	100	96
Dollars	780 M	560 M
Index	100	72
Siemens turnover		
In Germany (DM)	100	105
Abroad (DM)	100	195
Export portion	21 %	33 %
Area of silicon involved	100	176
Area of silicon delivered	100	236
Chip area	100	226
Chip price	100	120
Price per square-mm of silicon (DM)	100	53

(The area of silicon involved has increased much less than the area of silicon delivered because of improved production yields)

the past two years in Germany). The development efforts are presently focused on linear and laser TOP devices, and in particular on argon devices (Siemens is in fact getting ready to introduce an argon laser with internal resonator, which will be offered at 700 F in quantities of 5000 when it is mass produced).

In the passive area, Siemens makes the best of a difficult situation by concentrating large efforts on its electrolytic aluminum condensers (500,000 hours at 40 degrees C), its surface wave devices (Siemens is the European leader in this field), and its thermistors. These specializations allow the company to withstand a lower overall market growth than in the area of active devices. Siemens estimates that the passive market in the western world will go from 41.6 billion francs in 1981 (33 percent of the components market except for relays) to 60 billion francs in 1986 (25 percent of the components market). During the last fiscal year, Siemens has achieved a turnover of 1400 MF in the passive area (half of it in condensers), with a zero increase in received orders in Germany, and a 15 percent increase in export orders.

Siemens did not reveal its results in the semiconductor field, but points out the extent to which the situation in Europe, and especially in Germany, is difficult in this area. Europe in particular, derives very little profit from the games, videotape, and microcomputer markets. Moreover, in three years, the German semiconductor market went from 35 percent to 30 percent of the European market, to the benefit of Great-Britain and France. Siemens estimates that the European share the world semiconductors market will go from 25 percent in 1980 (out of a total of 14,000 million dollars) to 20 percent in 1982 (out of a total of 13,700 million dollars), and then to 17 percent in

1986 (out of a total of 30,000 million dollars, assuming an average world growth of 22 percent/year beginning in 1983). At that time, the portion of discrete components in the world would be only 5000 million dollars, against 4100 million dollars in 1982. Despite this, the German company hopes to derive profits in semiconductors in the next two years.

According to Siemens, the evolution of integrated circuits is stamped by the following phenomena:

Growing importance of C-MOS;

Emergence of different forms of custom circuits;

Trend toward integration of systems;

New standards imposed by the Japanese for quality, cost (automation), and customer service;

Reduction in the number of semiconductor manufacturers.

In discrete components, Siemens notes that the growth will be felt especially in opto-electronics, in power devices, and in high frequency.

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## ELECTRONICS

### AEG-TELEFUNKEN BANKRUPTCY PROCEEDINGS BEGIN

Paris ELECTRONIQUE ACTUALITES in French 29 Oct 82 p 20

[Unsigned article]

[Text] The court ruling for AEG, second largest manufacturer of electronic equipment in West Germany, will probably be opened on Sunday and should result in the rescue of the company, we learned Tuesday at the Frankfurt Court of First Instance.

It might be recalled that the president of AEG had asked for this judicial solution on 9 August, due to the serious difficulties his group had in meeting payments. The creditors will have to relinquish at least 40 percent of their claims. However, those whose claims do not exceed 10,000 DM should be fully reimbursed. The company's debts totaled nearly 5 billion DM at the time the court ruling was requested.

In concrete terms, the banking consortium should make available to AEG more than 2.2 billion DM (about 880 million dollars), to allow it to overcome its financial difficulties. In addition, the group should receive a new loan of 2.2 billion DM, disbursed equally by the government and the consortium.

Mr Duerr has also announced that the losses of the group should add up to one billion DM this year.

The clean-up plan for the group calls for the sale of "brown" activities (television, high-fidelity, and so on), to the Max Grundig company. However, after the bankruptcy of an AEG subsidiary specialized in washing machines, we still do not know the fate of the household appliance sector, in which the deficit for 1982 was expected to reach 275 million DM, with almost 3000 employees expected to be laid off.

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CSO: 3698/80

## ELECTRONICS

### BRIEFS

ITALIAN ELECTRONICS INDUSTRY REGROUPS--The four major Italian professional electronics companies, all of them in the public sector, have just announced their merger into a single group, Selenia-Elsag. These companies, which belong to IRI (Institute for Industrial Reconstruction), are: Elettronica San Giorgio (Elsag), Selenia, Selenia-Spazio, and Vitro-Selenia. The total turnover of these companies, which together employ nearly 10,000 persons, will reach more than 600 billion lire (about 450 million dollars) in 1982, and their orders amount to 2600 billion lire (1.8 billion dollars). A government development plan forecasts a total investment of 180 million dollars, and research expenses of 260 million dollars, in five years, between now and 1987. The regrouping of these four companies, which derive 70 percent of their turnover from exports, is intended to rebalance their civilian (industrial data processing, automation, and telecommunications) and military (defense systems and missiles) activities. [Text] [Paris ELECTRONIQUE ACTUALITES in French 29 Oct 82 p 9] 11,023

CSO: 3698/91

## ENERGY

### SIEMENS RESEARCHES HYDROGEN FUEL-CELL TECHNOLOGY

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT  
in German 23 Nov 82 p 5

[Text] Hydrogen is an environmentally safe secondary energy carrier which is advantageous for many technical applications. Due to its gaseous state under normal conditions, its storage is complicated and loaded with risks. So in recent years, Siemens has been working on a new storage method which uses a metal hydride store. The hydrogen here is chemically bonded with a metal. The volumes in the metal hydride store developed at the Erlanger Forschungslaboratorien, are about three times smaller than a compressed-gas bottle, the firm reports. Another advantage is the low working pressure which drops practically to zero in case of a sudden leak since in order to cleave off the hydrogen, heat is needed which can only be obtained from the outside. Due to the metal matrix, the metal hydride storage systems offer no weight advantages compared to a compressed-gas bottle, according to Siemens. In practical operation, in order to remove the hydrogen, heat is fed to the store via a pipeline. Upon charging, this heat is regenerated. The Siemens-developed metal hydride store is intended primarily for use together with a fuel-cell aggregate which provides the desorption heat. At a weight of 77 kg and a volume of 23 liters it can hold about 9 cubic meters of hydrogen. Its working pressure is around 4 bar at 20 degrees Celsius and about 7 bar at 40 degrees Celsius. Hydride stores and fuel-cell aggregate form more or less a store for electrical energy, Siemens reports.

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CSO: 3698/101

## ENERGY

### FRANCE, UK WORK ON DEVELOPMENT OF COAL-OIL FUEL MIXTURES

Paris L'USINE NOUVELLE in French 16 Sep 82 Supplement p 10

[Article by Dominique Benasteau: "Coal-Oil Mixture: A Confirmed Interest"]

[Text] Associating coal and fuel oil is an interesting idea being examined by certain industrial groups in the world. In France, the first long-term tests are getting under way, and England is preparing the first commercial unit for the production of the mixture. The possibility of converting existing oil burners without an excessive investment is backed up by the advantage of a considerable savings on the fuel bill.

"We are going to undertake long-term tests, lasting several months, in September at the Blanzky Coal Company burner," confirms the French Refining Company (CFR). Thus far, in Europe, the first combustion experiments with the coal-oil mixture (COM) have lasted scarcely a few hours. In a 50 t/h burner, designed to operate with ordinary heavy fuel oil, "modifications have been reduced," emphasizes the CFR. Contrary to what has been done in trials carried out in the United States, it has not been equipped with an ash collector. The evacuation of ash (some 50 kg per ton of coal burned) is handled by blowing and collection at the time of dust removal.

These tests mark the second phase in the development of the new fuel, because earlier it has had to be perfected. In France, that was the objective of a research program associating the FRC, the French Coal Company, Elf-Aquitaine, Creusot-Loire, and the French Petroleum Institute. For its part, BP [British Petroleum] was carrying out its investigations and decided to build commercial units, the first of which was to be located in West Thurrock where the prototype facility is already located. Paralleling all this, the Japanese have two projects for a COM (Coal-Oil Mixture) production center.

All of the technologies developed have the first phase in common, that is, the crushing of industrial coal to such a fineness that 80 to 95 percent goes through a so-called 200 mesh screen (particle size 75u). From there on, the processes diverge, depending on whether the introduction of a maximum quantity of coal or the stability of the mixture is given priority. The objective of the former is a half and half composition. Tests performed in France have resulted in rates of 45 to 48 percent coal. The stability of the mixture is assured by addition of additives, water in particular which has the advantage of a low price but reduces the heating value of the fuel. The Japanese have also oriented their research in this direction and three companies have become



interested in the production of surface-active agents for coal-oil mixtures, with and without water.

BP prefers to introduce a small refinement and performs a second crushing on the coal mixed with the fuel oil. The dispersion obtained in this way is stable without either additives or agitation. Stability tests over a period of 21 months, with temperatures up to 110 degrees [C] were satisfactory, but can the coal content, which was 40 percent, be increased? The double crushing has in its favor the ease of transport and storage, even long-term storage. However, it limits the possibility of substituting coal for fuel oil: some 32 percent instead of 40 percent savings for 50/50 mixtures.

In fact, the lower heating value of coal lowers that of the mixture, which is easily compensated by a slight increase of the flow rate. In any case, the higher viscosity of the COM makes for a slightly higher pumping power. On the handling side, the fuel does not raise any other problems, particularly problems of safety. However, this aspect is a definite handicap for the development of powdered coal in the medium and low [heating] values, for it is imperative that this fuel, which has been very successful in cement plants and steel manufacture, be made inert so as to avoid explosions.

However, the coal-oil mixture is not in direct competition with coal, but rather with heavy fuel oil. It could even have the same distribution network. And, above all, instead of requiring a considerable investment related to replacing equipment (some 25 million francs for a 50 t/h transtorage projection grate burner) that is required by the "return to coal," COM technology requires a less radical transformation (approximately 5 million francs of expense for a power of 50 t/h.) Thus, everyone who has modern equipment will be able to use it for the duration of its normal life, but under better conditions of profitability. With heavy fuel oil at 13.5 c/th [calories/thermie] and coal at 7 c/th, it is possible to recover 1.5 c/th performance, which is of course less economical than "all coal," which releases 5 c/th. But, considering the investment involved, the savings are then on the same order. And the coal-oil mixtures could well find their best argument in that fact.

Unless the potential users are still more sensitive to the fact of preserving the same operational capabilities of the burner. Startup, adjustment, lack of inertia, no noticeable difference has been registered during the tests carried out up to now. The only noticeable difference is in the "after combustion," and particular attention has to be paid to dust removal. Ventilation, in fact, assures the removal of the ash which are accumulating in the firebox, but it is important to capture them efficiently afterward. In order to do that, research is being carried out to improve cyclones or electrostatic precipitation devices.

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## INDUSTRIAL TECHNOLOGY

### 'MICRONORA 82' FEATURES AUTOMATED-ASSEMBLY EQUIPMENT

Paris L'USINE NOUVELLE in French 28 Oct 82 p 111

[Article by Daniel Coue: "Micronora 82: Spotlights On Automated Assembly"]

[Text] Component miniaturization, search for high quality/price ratios, sophistication of automatic feed mechanisms and transfer modules. Microtechnology experts place their knowhow in the service of all sectors. They can even talk to robots.

For its first rendezvous with microtechnology, the MICRONORA Show, which took place in Besançon on 21-25 September, was a show of innovation and... ingenuity. The knowhow of watchmakers found a spectacular illustration in a telecopier electrostatic print head developed by the TEM [expansion unknown] division of CIT [expansion unknown]-Alcatel with the cooperation of Norm, a Besançon consultant.

The original image is reproduced through the juxtaposition of minute black (loaded) or white (non-loaded) dots, with 60 dots per square millimeter. This initialization of the paper is done line by line: 1,728 dots in 10 ms, each dot corresponding to a conductor of approximately 0.1 mm in diameter, subjected to a 600-volt potential difference! "Actually," we were told at Norm's booth, "the difficulty resided mainly in industrialization. The traditional technique would have involved microcoils of enamelled wires, with several thousands of microwelds to connect the whole thing..." The solution: the coils were replaced by grids obtained through fine cutting, and the insulators were cast on location by elements molded in series. This resulted in considerable cost and dimension reductions. So much so that part of the demultiplexing could be integrated...

Norm's example is only one of many. Statice, a small design and development firm created by nine former Lip engineers, was showing the result of an industrialization study made for Facom. It is an angular position sensor with a very high quality/price ratio, developed together with its monitoring station... The precision achieved is  $\pm 3'$ , with a sensitivity of  $1'$ !

Another favorite field of former watchmakers: automated assembly. Sormel had waited for the MICRONORA Show to introduce its form-recognition system intended

for the Cadratic 745. Actually, the Cadratic is a programmable portal-shaped manipulator with a multi-effector head which can carry up to 10 tools. Strokes along the X-Y axes can be as high as 600 x 600, with travel speeds of 1,000 mm/s.

In this case, the head is equipped with six prehensile suction organs which position the six letters forming the word Sormel... But the S has been placed at random on an apprenticeship table and must first be correctly oriented. The system--developed with the cooperation of the Adersa-Gerbios laboratory for image treatment--determines the center of gravity and orientation of the letter after reading by a video camera placed above the work station. These data are then transmitted to the prehensile tool in charge of the letter S and which has one degree of freedom in rotation. The angular positioning is done in masked time during the return displacement.

#### Many Orientation Problems Simplified

A mere prestige operation? "Not at all," Jean Berger, research director at Sormel, assures us. "Form recognition should simplify many part-orientation problems in automated feed mechanisms, which now require lengthy adjustments. Sometimes, they simply cannot be solved..." At RBA (Roland Bailly Assembly), however, they prefer sticking to more traditional solutions that can be industrialized more quickly. For instance, the new and very clever SNV four-position orientator. It was developed to avoid having recourse to vibrating bins for the orientation of small bar-shaped parts (for instance polyamide connectors bodies). At the end of the vibrating rail, a sensor records the arrival position of the components. The system then determines the direction of rotation of a two-axis selector controlled by pneumatic jacks. Once the part is correctly position, it is pushed on a second feed rail perpendicular to the first.

Another RBA novelty: a small rotating tray (530 mm in diameter), model 224; it is a basic component for a small automatic-transfer assembly unit. It has a mechanical indexing system with 6, 8, 12 or 24 positions, which uses a brake or a clutch-brake motor, depending on the operating frequency, and provides a positioning precision of  $\pm 0.01$  mm.

At the Timex booth, we also discovered new linear-transfer modules which the famous brand is about to market. They are mainly designed for the assembly of large series of small assemblies at average operating frequencies. The pallets are pushed by a serrated device actuated by a motor driving an adjustable-pitch cam. The length available to install work stations and equipment is about one meter. Each module is provided with one upstream and one downstream buffer magazine loader operating according to the "first in, first out" principle. The pallets arriving at ground level are progressively lifted into the magazine loader from which they are sent to the transfer system as needed. At the other end, the reverse occurs. The pallets are recovered at ground level and transferred to another work station.

Advantages: the continuous circulation of parts inside the magazine loaders prevents them from remaining too long outside the production circuit. In addition, the irregularities and slight discontinuities (repairs, adjustments, etc.) of the work station can be absorbed ... to a certain extent. For

the system will work only if the magazine loaders are neither empty nor saturated! Therefore, the manufacturer has provided the possibility of regulating intermediate stock by outside additions or removals. The magazine loaders could then be disassembled and would be integrated in a handling circuit consisting, for instance, of wire-guided carriages, the first prototype of which was shown.

#### Promoting Conversion From One Type of Production to Another

A by-pass conveyor adapted to the basis of the structure makes it possible to skip work stations. A "Type-2" frame including two parallel transfer modules is also offered; the second transfer module can be used as a feed mechanism or to prepare components or subassemblies. Pallet coding should also provide a certain flexibility in the plants. The modular structure of the assembly makes it possible to shift from one type of production to another; according to Timex executives, the cost of such a shift "would as a rule not exceed 20 percent of the initial investment..."

The Jules Haag public vocational high school exhibited the latest realizations of the upper technician classes. For instance, an automated station where steel pins are driven out of small plastic pulleys, at the rate of 20 assemblies per minute. The system, designed for Prolabo, is managed by a programmable controller. One step higher: the Franche-Comte University, which is developing an advanced language, L. MAC, under the direction of professor Francois Lhote. This modular structure language--which can be adapted to any application--is intended for robot programming. However, in this field, the largest crowds were certainly attracted by a student, Mr El Samkari. He is the man who talks to robots... and makes them obey! As a part of his thesis, he has developed an artificial language which, through a speech synthesizing system, controls the various functions of the apparatus, including the opening and closing of the tongs. The 39 control codes are combined modulations of the vowels A, O and I.

#### New Welding Lasers

Another research project was just started in cooperation with Sagem and Renault Acma. They are trying to define the architecture and optimum programming systems for a robot designed to service a flexible machining cell operating 24 hours a day. The robot is expected to be in charge of control operations, either by positioning parts at a measuring station, or by bringing a measuring instrument to the machined parts, or again by checking dimensions through sensors incorporated in the robot itself.

At the Cheval Freres SA booth, another novelty: a YAG solid-laser machine with a 10 J output. "For the moment, pulsation is set at 2 Hz," Herve Picaud, technical assistant to the manager, told us. "But this model is designed for the welding of precious metals. In a few months, pulsation will be adjustable and increased to 20 Hz." Actually, Cheval has greater ambitions. Its research and development department is now developing a 1-J laser (pulsation adjustable up to 50 Hz) for small welded seams, mainly designed for the electronic sector (relays, etc.). And also a continuous 200-W YAG laser...

## INDUSTRIAL TECHNOLOGY

### ITALIAN MACHINE TOOL MAKER USES CAD/CAM ON PRODUCTION LINE

Paris INDUSTRIES & TECHNIQUES in French 1 Sep 82 p 28

[Article by A. L.]

[Text] Three computers linked to optimize the construction of mass produced machine-tools.

One manufacturer of machining centers is going ahead and installing CAD/CAM (computer-assisted design and manufacturing) to direct production lines with local programming: it is Mandelli, in Italy, at Piacenza, on the banks of the Po.

The same modern plant houses research, basic equipment machining, assembly, and the fabrication of numerical controls. The current phase of computerization connects the first two areas of activity. Its objective is not so much to reduce execution time, as to standardize the modular elements of various product lines, and to eliminate programming problems within the shop. Eventually, at the beginning of a job, a designer will gather technical and geometric data to directly produce a machining program. With the final installation of CAD/CAM before the end of the year, Mandelli will have for the time being, completed a long process of computerization over several stages.

The process began with management, on an IBM 38 central computer, used by accounting and personnel administration, by stores for parts supply and after-sales stocks, as well as by the production sector for product introduction, assembly management, and statistical analysis of failures. Terminals distributed through the sales department and the shops establish a dialog between operators and the central unit. Along with this, in a building adjacent to the research office, the Piacenza manufacturer has two computers for writing machining programs. The more powerful of the two, a Digital Vax 11/780, also verifies calculations of structures, resistance, and vibration phenomena, using a finite element method. In programming, it handles non-linear surfaces in five axes. The smaller computer in turn, programs in Modapt in 2.5 or three axes. It is by combining these two with the central unit that Mr Ferrari, in charge of methods, wants to achieve CAD/CAM. This is not merely a matter of distributing the programs among the

shop's machining centers. Through a true dialog, coordinating production starts and taking into account incidents on the machines, the computers will make the best use of production capabilities in real time. This method of organization is made more profitable by the fact that Mandelli handles recurring batches composed of 5-10 parts.

Will the Italian manufacturer go as far as a flexible shop? That is not certain, because the machining centers which he uses, although carrying his brand, are of an older model and not adapted to automatic parts flow, thus reducing the interest in total management flexibility. The more's the pity, since Mandelli has just introduced a new model, the Quasar, specifically designed for flexible islands, with a roller track on which circulate the parts carriers, interconnecting the machines. One of its French customers, Alstom Atlantique in Orleans, is actually installing a direct numerical control comparable to Mandelli's, which should result in the creation of a flexible cell. In Italy, as elsewhere, the cobbler is often the one with holes in his shoes.

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## SCIENCE POLICY

### MINISTER ANNOUNCES COMING CONFERENCE ON INDUSTRIAL POLICY

Paris ELECTRONIQUE ACTUALITES in French 5 Nov 82 p 4

[Article by DL]

[Text] On 2 November of last year, Mr Chevenement, minister of research and industry, introduced the Workshop on French Industrial Policy, which will be held on 15 and 16 November in Paris. As a first manifestation of a broad consideration of our industrial policy, which will culminate next June with the National Congress of French Industry, this workshop has two objectives: involve all economic agents (workers, engineers, staffs, and heads of enterprises) in the formulation of our industrial policy; and sensitize public opinion, mobilize it, and make it aware of the French industry. The fruits of this considerations will be a contribution to the Ninth Plan. They will inspire the formulation of a framework law for industrial development, integrated into the plan law.

Mr Chevenement wants to carry out a "mission of a cultural nature" to change attitudes and renew approaches to industrial problems. As a result, he compares short-term financial criteria to long-term development criteria. In this context, he assigns priority to foreign trade and employment.

"Information of general interest is necessary in the formulation of all projects; that is why I have ordered every one in the ministry to refuse all requests, to postpone all decisions, and to suspend all assistance, that do not take into account these two criteria," pointed out the minister, expressing the wish that "all national banks would do the same."

This preamble lends a decidedly dramatic tone to the style that the minister wants to adopt toward his industrial policy. But Mr Chevenement considers that the definition of an industrial policy can only be a collective and long-term effort.

Hence the workshop of 15 and 16 November, which will gather together 700-800 participants, divided into 10 work-groups focused on three topics: the balance-sheet ("because we cannot carry out a mission without knowing all its data"), the assets of industrial development (research-industry synergy, training and industry framework, financing resources, determining role of the

public sector, small and intermediate industries and regional development, and social dialog), and strategy (two reports will be presented on "A Competitive Industry in France and in the World," and on "Modernization and Development.") The workshop will be closed by a speech from the President.

Special events will follow the November workshop, among which discussions on research and industry, training and industry, financing and industry, creation of enterprises, staffs and enterprise management, quality, product design, and renewal of the sales function.

To support these general considerations, the minister already has two reports; one on "The Economic War: Evolution of the Rules of the International Game Since World War II," and the other on "A French Model to Overcome the Crisis," written by Mr Grjebine, master lecturer at the Institute for Political Studies. The writer stipulates a self-centered renewed attack on reconquering the domestic market, one of the prerequisite conditions being an accelerated reduction in energy dependence (annual investments of 30 billion would make it possible to reduce our energy bill by 35-40 percent in four or five years.)

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## SCIENCE POLICY

### DENMARK'S RESEARCH PRIORITIES: COMPUTER SCIENCE, BIOTECHNOLOGY

Copenhagen BERLINGSKE TIDENDE in Danish 12 Nov 82 p 11

[Article by Lisbeth Knudsen: "Government Will Put Money Into More Research"]

[Text] There is to be a heavy investment in strengthening of basic research in Denmark and of training of researchers at universities and higher educational institutions.

This is Education Minister Bertel Haarder's line in the research review he delivered to the Folketing [Parliament] yesterday. But increased funds were not placed at the disposal of research in the review. The money will be gotten by lowering the priority of other areas and by a stronger concentration of efforts in the research area in selected fields.

Bertel Haarder in his review places much weight on cooperation between the public and industrial sectors in the area of research and designates two fields in which the government wishes very high priority for research for the sake of Danish industry and exports. This is research in computer science and biotechnology.

Computer science revolves around so-called "chips," or integrated electronic circuits, and computer software must be produced in order to utilize these "chips." The minister believes that here there are big opportunities for Danish exports.

"We must invest in advanced data processing, which holds very broad prospects," says Bertel Haarder. He believes that universities and educational institutions must as quickly as possible begin development of information science, for example, as a research field. Of other areas within computer science the minister mentions the development of robots for industry and the so-called "broadband network" for data transmission. The latter is also included in considerations regarding the government's investment plan.

In the field of biotechnology the minister believes there are other big opportunities for Danish industry through an increased research effort. Biotechnology can for one thing form a basis for production of synthetic fuels, fertilizers and food-stuffs, for the utilization of waste, and the like.

Bertel Haarder points out in his research review problems with the supply of and demand for researchers in fields undergoing strong growth, coordination problems intensified by all too many small research entities, insufficient evaluation of the

quality of research and too little practical utilization of research results. As temporary initiatives from the government in the research field Bertel Haarder mentions a longterm plan for recruitment of younger researchers. This will involve 100 extra new appointments per year up to 1993 in temporary jobs, from which recruitment for permanent scientific jobs can take place. In this manner it should be possible to hold onto younger talent.

The government is considering a number of initiatives which will create more mobility among researchers. This involves leave-of-absence arrangements, part-time pensioning of older researchers, combination jobs and moving arrangements.

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## TRANSPORTATION

### NC RIVETER DEVELOPED FOR AIRBUS PRODUCTION LINE

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT  
in German 24 Nov 82 p 5

[Text] After four years of definition and development work, an automatic riveter has been produced for the Airbus skin production line for companies belonging to MBB. This numerically controlled riveter is considered by the company to be among the "technically most perfect joining and assembly systems anywhere:" It clamps the parts together, measures the material thickness in order to select the appropriate rivet length, selects the drill bit and rivet type, drills the appropriate rivet hole, coats the freshly bored hole in the aircraft's outer skin with anti-corrosive agent, inserts the rivet and produces the riveted joint; it then releases the clamping and moves to the next rivet position. All this is done in a few seconds, reports VFW.

The fast and accurate movement to the riveting positions takes place in up to six axes, all numerically controlled simultaneously and both the automatic riveter and also the component--in this case the Airbus skin--move. Finding the precise rivet length occurs through the setting of desired coordinates from punched tape and an actual-value coordination via an optical sensor. This optical sensor seeks the hole of a blind rivet in order to be able to make precise drilled holes in this temporary rivet axis. In other words, the exact rivet position is received by the NC riveter from the computer, with its dimensions from the design drawings, and also from the optic-sensory actual-value search control. Both systems are mutually supportive in order to compensate for tolerances.

Additional advances like the newly developed, automatic tool changer for drill, riveting tools, rivet feed elements, and the adjustment of the diameter, drill and rivet parameters including monitoring of the final rivet-head height are, according to VFW, the most important advances over standard numerically controlled automatic riveters.

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## TRANSPORTATION

### FRG AERONAUTICS INDUSTRY BEGINS WORKER LAYOFFS

Paris AVIATION MAGAZINE INTERNATIONAL in French 1 Nov 82 p 14

[Article by Jean Roussel: "Layoffs to Protect the Future"]

[Text] Bonn--Until now, among the various branches of German industry, aeronautics construction has been the least affected by layoffs. Whereas the threshold of 2 million unemployed has been crossed for the country as a whole (representing an unemployment rate of 7.5 percent of the active wage-earning population, against 7.2 percent last July), Germany's aeronautics industry has slightly increased the number of its workers. At the beginning of this year it employed 75,300 people, compared to 73,000 last year, while achieving a turnover of 11,518 million DM, compared to 9,371 million in 1980).

Observers therefore consider as an alarm signal the announcement recently made by Johann Schaeffler, director of MBB, according to which the company will have to lay off 1500-2000 people in 1983, out of a total number of 39,000 employees. We know that since the absorption of VFW in 1980, the MBB group has become the leader in German aeronautics construction, with a turnover of about 4 billion DM (which is slightly below that of Aerospatiale).

Mr Schlaeffer justified this decision (which is actually not final) by citing "difficulties encountered by the civilian aeronautics market." According to him, there had been no sign to indicate, beyond the second half of 1985, a significant improvement in the utilization of production capabilities devoted to the Airbus. Hence the gradual reduction in personnel planned for next year, so as not to be forced into taking harsher measures at a later time.

German aeronautics circles believe that the personnel reduction announced by MBB originates from downward revisions of prospects for the Airbus program. These circles estimate that the production rate growth will be lower than expected, and that in the intermediate future a production of 6-7 Airbuses per month should be forecast, instead of the eight initially inscribed in the program. The same circles point out that even if the 150-seat A-320 project should be completed, the German builders would not derive sufficient advantage from it to avoid large layoffs. Indeed, their part of this project would be decidedly lower than the one they have in the production of the

intermediate-courier heavy transports A-300 and A-310. The German manufacturers expect a participation of only 20-25 percent instead of the 37.5 percent represented by their current share in the Airbus program. But in Munich it is said that things would be different if Airbus Industrie finally decided to accept the long-courier versions TA-11 and TA-12, which in principle are planned for much later. In fact, it would be possible to undertake the production of these new versions by using the equipment currently used for the Airbus program, without having to commit significant investments. In this case, the German builders would retain the portion of production that they currently hold. They continue to remain very reserved, even hostile, about developing their participation in the construction of the "small" A-320.

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## TRANSPORTATION

### BRIEFS

RENAULT UNVEILS 'VESTA'--On the eve of the Paris Auto Show, which will open on 30 September, Renault unveiled the 'Vesta,' an extra-light experimental car using less than 3 liters per 100 km. The 'Vesta'---a name standing for Advanced Technology and Systems Economy Vehicle---is a "laboratory on wheels." It will not be available at Renault's dealers, Bernard Hanon, chairman and managing director of Renault, stated; it is only a prototype intended to enable technicians to develop the car of the 1990's. This experimental front-drive model, which will start driving on Renault's test tracks in 1983, is endowed with enhanced aerodynamics (with a CX coefficient of 0.22) and weighs only 520 kg, i.e. 30-35 percent less than a vehicle of similar size--3.2 m long by 1.52 m wide--manufactured today. The first tests have shown that 'Vesta' will consume an average of 2.99 liters per 100 km (2.28 liters at 90 km/h; 3.64 liters at 120 km/h; and 3.05 liters in city driving). The research program which produced this Renault prototype was initiated in January 1981 by the State, which also provides 50 percent of the financing. [Text] [Paris AUTO-INDUSTRIES in French 30 Sep 82 p 3] 9294

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